VIRGINIA DEPARTMENT OF EDUCATION
DIVISION OF
TECHNOLOGY, CAREER & ADULT EDUCATION
OFFICE OF EDUCATIONAL TECHNOLOGY

Information Brief
FEBRUARY • 2013

Division-Based Development of Open Education Resources

INTRODUCTION

The Open Education Curriculum Board is an advisory board whose authority is prescribed in the *Code of Virginia* §2.2-2464. The Board is charged with advising the Governor and the Board of Education on the creation, collection, categorization, distribution and licensing of open education resources and the alignment of those resources with the Virginia Standards of Learning. While the policy issues that the Board is attempting to address are related to broader concepts of using open education resources (OER) and do not specifically require divisions to develop and distribute OER, this information brief is intended to assist school divisions that wish to pursue the development and distribution of OER.

Open education resources (OER) are "teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use or re-purposing by others. Open educational resources include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge" (Atkins, Brown, & Hammond, 2007, p. 4).

A copyright holder can designate any digital educational material as an open education resource by using the popular Creative Commons licensing scheme or a similar license that supports open use of the material. Open use means more than being able to access the material for free. It also means that the user might edit or repurpose the material to adjust it to their specific needs. The producers of OER are generally educators, educational foundations or institutions, universities and colleges, students, nonprofit organizations, or government agencies. OER are usually made available through the Internet.

Divisions that are interested in encouraging teachers and students to develop OER will want to plan the launch of such a project carefully. These plans should reflect each division's philosophy toward education, detailing how OER can support these goals. The division will need to create or adjust policies and procedures to address specific OER issues. It also will need to develop technical specifications and may need to improve some infrastructure to provide a reliable system that supports the OER.

Infrastructure and Connectivity

One of the first steps may be to upgrade infrastructure—a potentially expensive undertaking—to handle the storage and delivery of OER. Storage space can quickly become a problem, especially if any of the materials include multimedia. For example, a 20-minute video compressed to moderate quality could take up to 100 MB in file space, which could require 2-10 minutes to download, depending on broadband capabilities. A typical high-quality three- to four-minute audio file could take up to 4 MB in space and require approximately 4-30 seconds to download—again, based on broadband connection speed. Divisions may want to consider cloud storage to handle the volume. Cloud storage is a system in which data are stored, managed, and backed up off site, typically by a third party. Users access the data over the Internet. Divisions that work with multimedia files will also want to ensure their bandwidth to all buildings can handle multiple downloads and/or streaming of the same file at the same time.

Another option is to create a space in one of the many OER sites that allow contributions, such as Connexions, Curriki, Virginia on iTunes U, or eMediaVA. Such sites may allow divisions less control over the resources but also require less local responsibility for managing and storing them.

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Creative Commons License Options: What Are the Licensing Choices?

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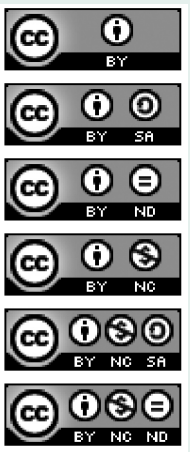
Share Alike. You let people create remixes and derivative works based on your creative work, as long as they distribute them only under the same Creative Commons license that your original work was published under.

No Derivative Works. You let people copy, distribute, display, and perform only verbatim copies of your work—not make derivative works based on it. If they want to alter, transform, build upon, or remix your work, they must contact you for permission.

Based on these choices, you can get a license that clearly indicates how other people may use your creative work.



Attribution

Attribution—Share Alike

Attribution—No Derivatives

Attribution—Noncommercial

Attribution—Noncommercial—Share Alike

Attribution—Noncommercial—No Derivatives

Source: Atkins, Brown, & Hammond, 2007

A decision should be made at the outset as to who will have access to the management system, and with what capabilities. The options range from total control at the central level—with only one person or group allowed to make changes and upload materials—to a completely open system that allows any user to post materials, repurpose materials, and comments. The educational goals for the project will help direct the structure of the system. For instance, if a major goal is to encourage teachers to experiment with new approaches to teaching, divisions may want to allow teachers to control at least one section of the OER system so they experiment and communicate freely with one other.

Software for managing the storage of OER is increasingly becoming available; some is open source. Divisions may choose to create simple Web pages with links to their uploaded resources; however, such a system would most likely not support effective searching or user interactions with the resource (and author)—this latter capability is helpful for keeping the OER system relevant to the users or for using the OER system as a change agent for pedagogical approaches. Additionally, open source management software might help keep the OER repository from becoming a "backwater pool" that no one else can find or use. As discussed below, one incentive for educators to share their materials is the gratification of knowing that others find them useful. Increasing the number of users motivates many teachers to share what they have developed.

One major feature to look for in system software is the capability for users to add comments, upload their own materials, and/or rate materials. Are users allowed to post modifications of the original material (for example, a Spanish language version of a handout explaining the three branches of the U.S. government)? Can users comment on the material, such as suggesting changes or explaining how they used it? Some systems allow a rating system to encourage high-quality contributions. Even a simple e-mail link to the author of the material promotes interactions between the author and user.

Divisions will want to ensure that their back-up systems can handle the extra load and easily and quickly replace resources lost to unforeseen technical problems.

Copyright Designation and Other OER Creation Considerations

An essential issue that permeates OER development is copyright. School boards and administrators may need to develop new policies or revise current ones to address teachers' and students' potential concerns about posting their work. Generally, based on their normal division contracts, work created by educators during the school year is considered the division's property. But, what about work created by students, or by teachers during their summer breaks? Divisions may want to provide some ready guidance about copyright so that teachers and students are aware of their choices in the matter. Also, if divisions create materials using grant funding, they must follow any grant requirements for copyright.

In the spirit of OER, divisions may want to use either Creative Commons licensing or another similar type of open licensing. Creative Commons is becoming well accepted in the education community and is easy to use and understand (see sidebar). Users most often choose the Creative Commons "Attribution-Noncommercial-Share Alike" option, which allows others to repurpose the materials freely as long as they don't sell the resulting product.

Material Quality

Ensuring the quality of OER is a major concern for school divisions and the main reason that divisions should encourage their own teachers to create OER. Even though teachers already share resources, there are no guarantees that these materials will align to the curriculum or be accurate, legal, or even useful. Divisions need to institute some measure of quality control to ensure that OER meets all of these criteria.

Each division's approach to this task depends on its available resources. Curricular experts could help at the beginning of the project to create a process for teachers and students to submit materials. Then, these experts should review all materials before any are posted as OER. This process may include a step that allows for editing resources that are good but not yet great. Divisions may want to adopt a self-scored rubric that ensures resources meet the established criteria for certain content and technical features; for an example, refer to the Virginia on iTunes U rubric at

http://itunes.apple.com/us/itunes-u/providing-content-for-virginia/id387895795?i=87442984.

As an alternative to curricular experts, divisions may rely on their teachers to provide feedback on resources—using a rating or comment system and adding information that might not be included in the original resource (for example, how the material might be used with learning disabled students). For this type of system to succeed, divisions will need to approach the OER management system as part of a larger project—developing personal learning networks among their educators. A certain level of trust and respect must exist among those involved so that critiques help refine resources rather than stifle creativity; it is a good idea to have in place a set of guidelines for appropriate community behavior and commentary.

Whichever approach is implemented, certain attributes of the resources should be assessed. Do they align with state standards and local curricular guides? Do they use a desired approach to teaching or learning? If they are to be used by students independently, do the materials provide enough information for learning and do they provide different learning modalities? If intended, will the materials support a particular pedagogy? Can students with various disabilities access the resources? Are all elements included in the material, such as graphics and quotations, copyright free or have they been cleared for nonprofit educational use? Achieve (see below in Resources) has created several rubrics for evaluating resources; these can be adapted for each division's use.

The process should include some safeguards for the thorniest issue—copyright clearance. The creator of the material should certify that his or her work does not include any proprietary or copyrighted material—or include the written permission that specifies the terms of use. If possible, at least two people should review materials to help ensure that copyrights are not being violated—even if it was inadvertent.

Divisions that make OER available through the Internet should consider complying with the safe harbor provisions of the Digital Millenium Copyright Act, including the requirement that online service providers designate an agent for receiving notice that posted materials infringe a third party's copyright. An agent for receiving copyright notices may be designated by submitting a form to the U.S. Copyright Office and paying a registration fee of approximately $100. In conjunction with that designation, the Web site where the materials are hosted should include contact information for the designated agent to allow copyright owners to alert the division if infringing materials are being distributed.

Cataloguing and Metadata

For OER to be useful, the system must include an easy way to locate materials. Maintaining an up-to-date searchable catalogue helps users find materials. It also should feature some way to mark the most recently added materials. Another helpful feature would be a mechanism to inform users when a resource has been removed or moved to a new location within the system. In addition, search functions that rely on only one or two categories (such as title or grade level) are limited in that they often return too many "hits," making search time consuming for teachers and students.

Metadata is the most flexible and direct way to ensure that various qualities of any particular asset are identified and that appropriate resources can be located for specific user needs. Divisions need to determine which tags to use; these can include anything from the appropriate reading level to the need for a proprietary system (such as SMART Boards or iPads) to specific learning skills addressed by the materials.

Currently, the U.S. Department of Education is leading an effort to facilitate the sharing of metadata among states (much of which will be based on Common Core Standards). This Learning Registry will allow the use of social metadata, which provides information on how specific resources are being used by which demographics (e.g., grade levels, geographic areas), and how often. Divisions contemplating the development of a "node" as part of the national Learning Repository should ensure that their system is compatible.

Maintaining Vitality

OER repositories abound on the Internet, but the most useful ones are regularly maintained and expanded with new materials. Each division's OER process should include a plan for continual growth.

The key to a truly useful OER system is great resources. To encourage teachers and students to participate, divisions may need to provide incentives. This could mean money, but this option could be cost prohibitive. One possibility is a comments feature, which could allow others to "thank" the teacher who created the materials—most educators are willing to share their work as long as they feel like others appreciate it. This can also promote collaboration. Another approach might be to create a bookmarking system, allowing users to keep track of materials and notifying the creator that someone has bookmarked his or her resource. Another strategy is to provide professional development credit for teachers who post resources. Students also could receive credit for materials they contribute.

In maintaining the OER system, it is helpful to track the number of downloads and eliminate outdated or unused materials. Additionally, the system should search automatically for embedded links that no longer function; it is irritating to identify a great resource only to find that the link no longer works. To maintain vitality, the system should also allow users to post adaptations of original materials.

Conclusion

As with any education system, planning is of paramount importance when divisions want to encourage the creation and

sharing of OER. Planning depends on understanding the system's purpose and end goals. Multiple stakeholders should help plan and implement an OER management system to ensure that it fulfills the purpose and goals. The inclusion of multiple stakeholders also ensures that the OER management system will have many advocates rather than relying on the energies of a few dedicated individuals. By setting high expectations for quality, relevance, and usefulness for contributed materials, the system builds its own self-sustaining success—users will frequently find the OER they want to use, and creators will be motivated to continue providing materials for an appreciative group of educators and students.

REFERENCES

Atkins, D. E., Brown, J. S., & Hammond, A. L. (2007). *A review of the open educational resources (OER) movement: Achievements, challenges, and new opportunities*. N.p.: The William and Flora Hewlett Foundation. http://www.hewlett.org/uploads/files/Hewlett_OER_report.pdf.

RESOURCES

General

A Basic Guide to Open Education Resources (United Nations and Commonwealth of Learning)
http://www.col.org/PublicationDocuments/Basic-Guide-To-OER.pdf
This is a fairly thorough review of the implications of OER for education from an international perspective.

OER Handbook for Educators (WikiEducators)
http://wikieducator.org/OER_Handbook/educator
This is an open resource for educators who are interested in finding and creating OER.

Open Educational Resources (Achieve)
http://www.achieve.org/oer-rubrics
These eight rubrics help educators evaluate OER based on several different criteria. They can help with creating and using OER.

Open Educational Practices and Resources: OLCOS Roadmap 2012 (Open eLearning Content Observatory Series)
http://www.olcos.org/cms/upload/docs/olcos_roadmap.pdf
This study of OER development in Europe and beyond provides practical recommendations for various constituents.

Learning Registry (U.S. Department of Education and U.S. Department of Defense)
http://www.learningregistry.org/
The Learning Registry is an open source technical system that facilitates the exchange of data.

Digital Textbook Playbook (Federal Communications Commission)
http://www.fcc.gov/encyclopedia/digital-textbook-playbook
"The Digital Textbook Playbook is a guide to help K-12 educators and administrators begin building rich digital learning experiences for students in districts across the country. The playbook offers information about determining broadband infrastructure for schools and classrooms, leveraging home and community broadband to extend the digital learning environment, and understanding necessary device considerations. It also provides lessons learned from school districts that have engaged in successful transitions to digital learning."

Creation Specific

License Your Work (Creative Commons)
http://creativecommons.org/about/license/
This is a full description of the choices for Creative Commons licenses.

Choose a License (Creative Commons)
http://creativecommons.org/choose/
This self-guided tool helps users create appropriate licenses to assign to particular works.

Open Education Resources Center for California (home page)
http://grou.ps/oercenter
This list of tools helps users to create or remix materials.

80 Open Education Resource (OER) Tools for Publishing and Development Initiatives (Online Education Database)
http://oedb.org/library/features/80-oer-tools
These links lead to sites that assist in creating and publishing OER.

OERGlue (home page)
http://www.oerglue.com/
This OER course creation tool allows users to create interactive courses and publish them on the OERGlue Web site for sharing with others.

eduCommons (home page)
http://educommons.com/
This is an open source content management system.

Wikiversity (home page)
http://en.wikiversity.org/wiki/Wikiversity:Main_Page
This space allows teachers to share their OER and to participate in learning communities.

What Status for "Open?" An Examination of the Licensing Policies of Open Education Policies and Projects (The William and Flora Hewlett Foundation)
http://learn.creativecommons.org/wp-content/uploads/2009/01/license-mapping-report-15_dec_-2008-color-v2.pdf
This is an excellent overview of copyright issues that relate to creating and using OER materials.

These URLs were active at the time of publication. For a current list of resources visit http://delicious.com/vdoe_oer.

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www.doe.virginia.gov/VDOE/Technology